

SABIC  
Innovative  
Plastics™

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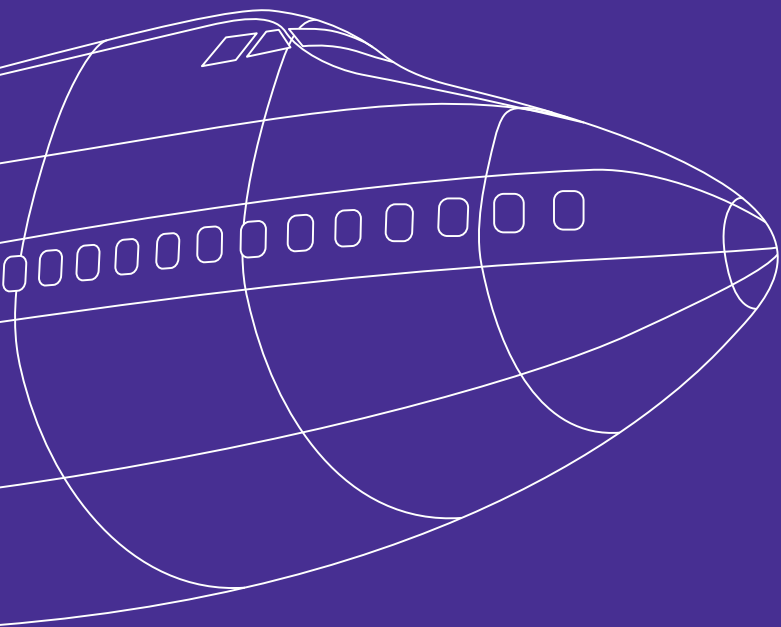
High performance materials for aircraft designers



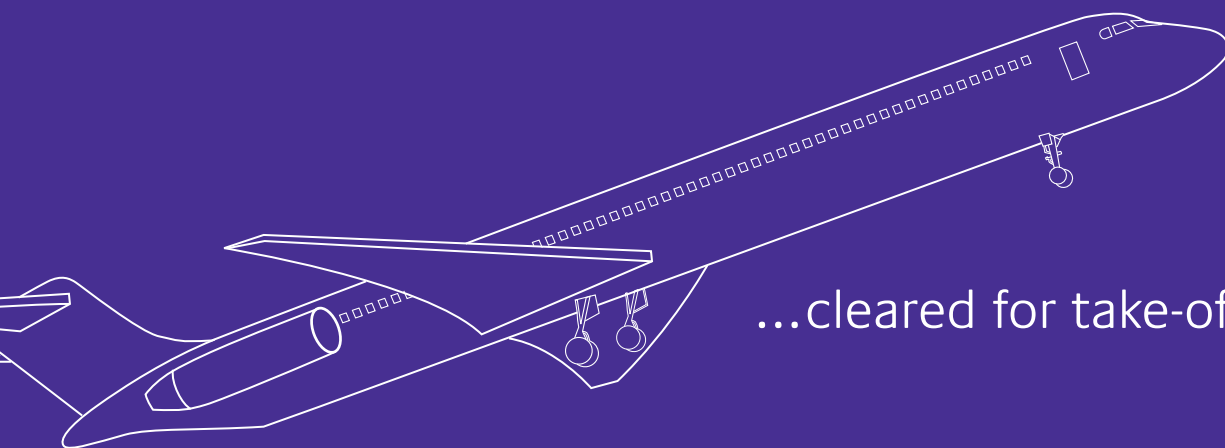
# Islands in the sky

New solutions for aircraft designers

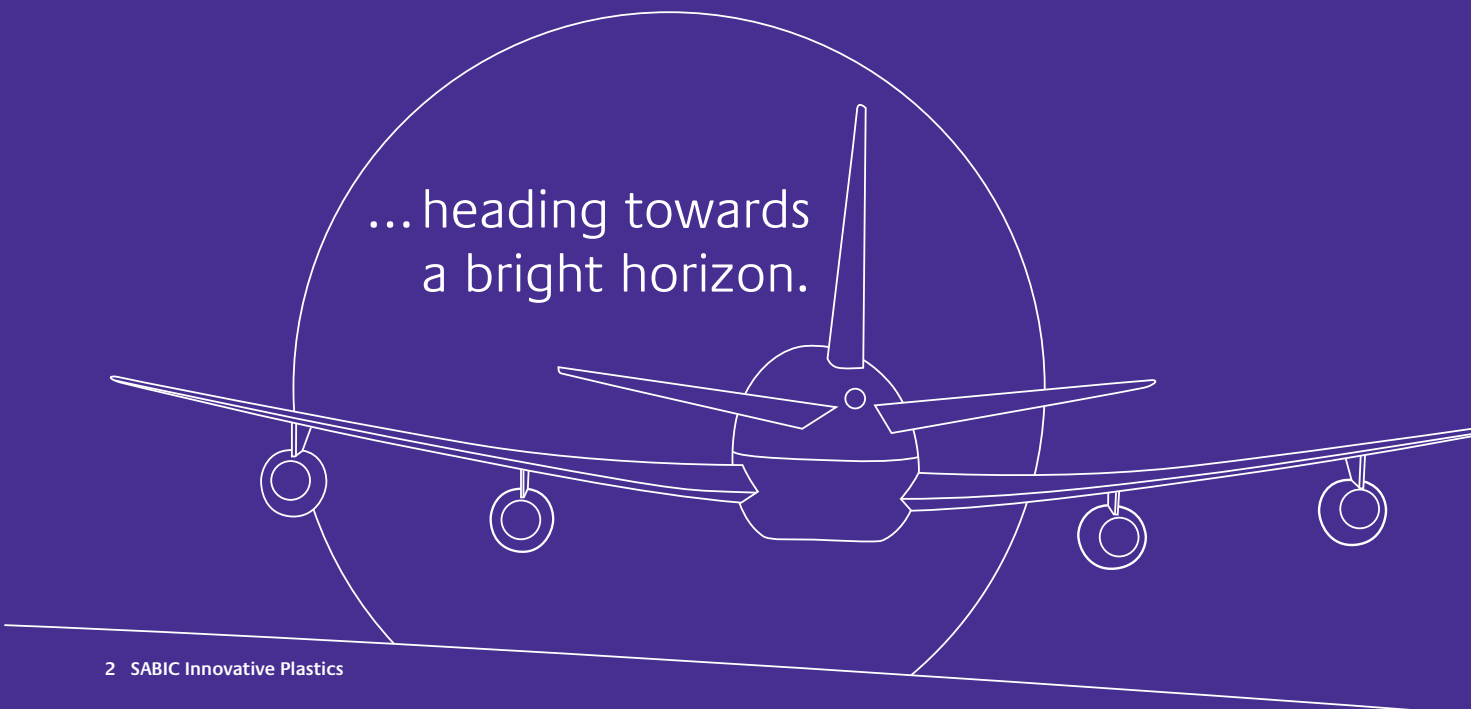
Sharing our futures



Materials designed  
for flight...



...cleared for take-off...



... heading towards  
a bright horizon.

SABIC Innovative Plastics has been an important part of the Aerospace industry since its inception. During that time, our advanced materials technology has helped make aircraft more efficient, more enjoyable and safer. In addition to meeting the performance challenges of the civilian sector, SABIC Innovative Plastics' outstanding portfolio also carries the potential to be the material of choice for the military of the 21st century.

Our commitment to innovate never rests. SABIC Innovative Plastics will continually invest in advanced new resin, sheet and composite technology to provide its customers with cutting-edge materials solutions for years to come.

- Lower overall aircraft weight for increased fuel efficiency
- Reduced operational and maintenance costs
- Extended lifetime
- Less cabin noise
- Enhanced passenger safety
- Cutting-edge solutions with ongoing material innovations

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The history of flight is about reaching

# REACHING EVER HIGHER



# Reaching upward through innovative design and better materials. That impulse has led to aircraft today that are more fuel efficient, increasingly comfortable and safer.

SABIC Innovative Plastics is committed to continuing that trend – to reaching higher – by providing advanced material technologies that enable ever greater weight reduction, higher resistance to impact and chemicals, improved heat performance, more stringent flame retardancy, enhanced smoke and toxicity properties, lower cabin noise and overall performance for both civilian and military aircraft.

Building upon the outstanding historical performance of Lexan\* polycarbonate resins and OSU compliant Ultem\* resins, SABIC Innovative Plastics is now expanding its portfolio of materials solutions to help aircraft manufacturers develop a new generation of advanced interior components.

The following pages provide more specific guidance on SABIC Innovative Plastics' broad product portfolio of performance, processing and aesthetic options for aircraft interior components. It's only an introduction, so please contact us to learn more about our global supply of high-quality advanced resins and world-class technical support.

## **Lexan FST resin and XHR sheet**

The aircraft industry has for years sought a heat release (OSU) and flame, smoke, toxicity (FST) compliant engineering resin with improved colorability and processing. Now, SABIC Innovative Plastics has delivered.

Lexan FST resin combines the processing window of polycarbonate with the OSU 55/55 capability of PEI resins. Available in pellet form or as Lexan XHR sheet, it offers broad options for applications requiring molded-in color (including bright whites) and indoor weathering performance.

Combined with its full FST compliance, this revolutionary new material can help simplify the supply chain and reduce production costs and weight by eliminating paint. Plus, its high ductility is an attractive solution for parts requiring high abuse tolerance, or for thin-wall applications that require reduced part weight.

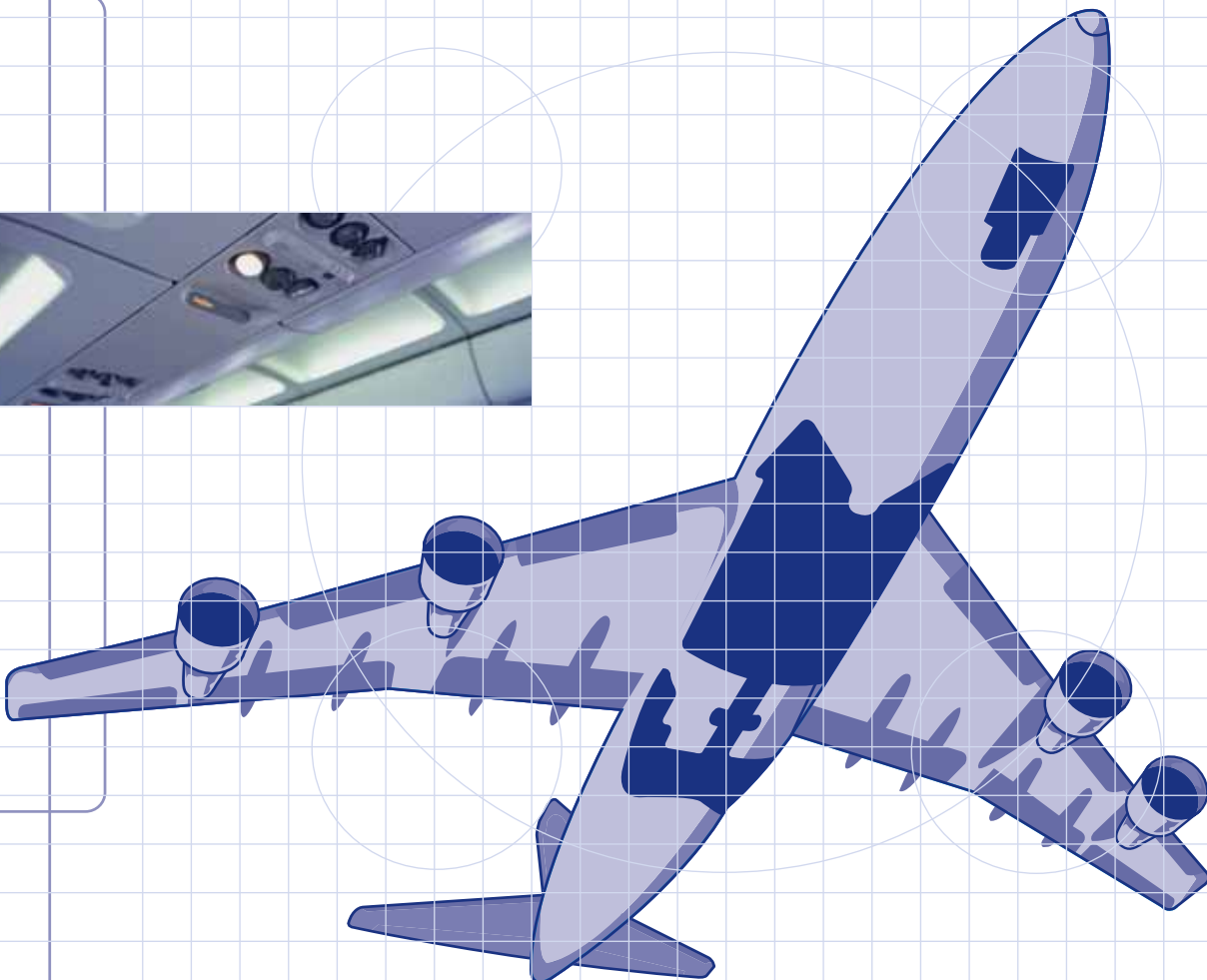
This new copolymer platform has potential for other materials such as high clarity, transparent resin and sheet products that will satisfy new industry trends such as larger windows, transparent partitions and stairways, and LED lighting panels.



Lighter and more efficient, modern aircraft make good use of the properties of Lexan polycarbonate and OSU-compliant Ultem resins.

SABIC Innovative Plastics materials deliver more than outstanding dimensional stability for injection molded and profile extruded cabin components. They also provide broad aesthetic options, resistance to fire and compliance with aircraft safety standards.

## DESIGNED FOR FLIGHT



**Flame-resistant Ultem\* resins**

SABIC Innovative Plastics' broad portfolio of Ultem resins is already a familiar fixture among today's aircraft interiors. This material family combines outstanding heat resistance and flame retardancy, with high modulus and broad chemical resistance.

The underlying materials technology continues to evolve to meet today's challenges in civilian and military aircraft. OSU 55/55 compliant Ultem 9085 resin, a latest advance in technology, has improved upon SABIC Innovative Plastics' benchmark grade Ultem 9075 resin by providing better flow, impact performance and lighter colors while maintaining its high modulus. This enables thinner walls and reduced component weight for applications such as personal service units and bezels.

In addition, the Ultem product family offers other select grades that provide targeted properties, such as higher heat or chemical resistance for injection molded connectors. Ultem grades deliver compliance with the aircraft industry's stringent requirements for aircraft interiors on flammability, smoke density and toxicity including OSU 55/55 capability. The materials' superb heat and fire resistance make them excellent candidates for AC ducts and light holders.

**Revolutionary Lexan\* FST resins**

SABIC Innovative Plastics' new Lexan FST9705 resin is a quantum leap in processing performance offering molded-in colors (including bright whites), enhanced chemical resistance and full FST compliance (including OSU 55/55 capable).

Lexan FST9705 resin's potential for replacing painted parts can help simplify the supply chain, while its high ductility makes it an excellent material of choice for thin-wall applications.

**Noryl\* and Lexan resins**

The low specific gravity of Noryl resins offers a lightweight, dimensionally stable alternative to filled or unfilled polyamides for painted or hidden applications that do not require OSU 65/65 heat release compliance.

Grades such as Noryl LS175 resin offer options for non-halogenated flame retardance and low smoke density. SABIC Innovative Plastics has further expanded these options with Noryl LS6010 resin, which provides the additional capability of producing lighter colored components.

In addition to high impact resistance, the Lexan ML series of engineering resins have historically delivered aesthetic options from crystal clear transparency to high chroma color pigmented applications, while providing fire compliance to vertical burn, smoke density and toxicity.

**LNP\* specialty compounds**

LNP Specialty Compounds business offers solutions for weight reduction, parts consolidation, elimination of secondary operations and improved performance, durability and aesthetics.

For example, reinforcing Ultem resin (PEI) or PEEK with carbon fiber offers a material with very high temperature performance coupled with superb mechanical strength and stiffness. Representative products, such as Thermocomp\* EC1006 specialty compounds based on Ultem resin and LC1006 based on PEEK can help replace metal parts.

**SABIC Innovative Plastics extruded sheet for flat and thermoformed applications**

Ultem* 1xxx unfilled resins Ultem 2xxx glass filled resins Ultem CRS5000, XH6000 & 8000 series resins	FAR25.853 OSU 100/100 capable 12 & 60 sec. vertical burn Smoke density and toxicity	<ul style="list-style-type: none"> <li>Enhanced chemical resistance or high heat for connector applications</li> </ul>
Ultem 90x5 unfilled resins series Ultem AR9x00 glass filled resins Lexan* FST9705 resin	FAR25.853 OSU 65/65 12 & 60 sec. vertical burn Smoke density and toxicity BSS7239, ABD0031, SMP800C	<ul style="list-style-type: none"> <li>Best-in-class flame, smoke, toxicity</li> <li>Painted and high modulus applications for Ultem resin series</li> <li>Integral color and high impact applications for Lexan FST9705 resin</li> </ul>
Lexan ML resins series Lexan 9xxA resins series	FAR25.853 12 & 60 sec. vertical burn Smoke density and toxicity	<ul style="list-style-type: none"> <li>Opaque or transparent resins</li> <li>High-impact resistance and colorability</li> <li>Non-OSU applications</li> <li>Low specific gravity applications for Noryl resins</li> </ul>
Noryl* LS resins (Noryl LS6010 resin)	FAR25.853 OSU 100/100 capable 12 & 60 sec. vertical burn Smoke density and toxicity	<ul style="list-style-type: none"> <li>Non-OSU applications needing low smoke</li> <li>Low specific gravity applications</li> </ul>



Vaupell Industrial Plastics aircraft video display molded from Ultem 9075 resin



Goodrich Hella Aerospace Lighting System's new passenger service unit using Ultem resin



Air duct using Ultem sheet offering flame resistance, toughness and formability for this application

Sheet and film made from SABIC Innovative Plastics resins enable thinner walls that do not compromise dimensional stability or strength. They can also deliver powerful resistance to flame, smoke and toxicity for the next generation of innovative aircraft components.

## CLEARED FOR TAKE-OFF





### Incredibly versatile Lexan\* sheet and film

Lexan sheet product family is a familiar fixture aboard today's aircraft, where it provides a broad range of performance options for interior components. Based on exceptionally tough polycarbonate resin, Lexan sheet resins set industry standards for excellent impact strength, outstanding dimensional stability at elevated temperatures and aesthetic versatility.

Specifically, Lexan sheet offers a broad palette of over 250 colors, and no loss of performance or property retention when draped or thermoformed into complex 3-D shapes. The material's low 1.21 g/m<sup>2</sup> density signals the potential for up to 15% weight reduction compared to PVC-based materials.

The Lexan sheet portfolio also offers a broad range of options for applications needing transparent material. Examples include Lexan MRAC sheet and Lexan FMR604 sheet, which are optical-grade products with a proprietary hard coat for maximum service life. Transparent Lexan F2000 or F2100 sheet, and Lexan 9600 sheet offer uncoated options.

### New Lexan XHR sheet

SABIC Innovative Plastics presents a paradigm shift in sheet products that allows thermoforming performance of a standard opaque polycarbonate material while offering molded-in-color capability (including bright whites), texture retention, enhanced chemical resistance and full FST compliance (including OSU 55/55 capable). Lexan XHR6000 sheet's potential for replacing painted parts that are vacuum formed can help simplify the supply chain for Seller-Furnished Equipment (SFE) such as cockpit and flight deck liner parts, and Buyer-Furnished Equipment (BFE) such as Aircraft Seating components.

The list of applications for Lexan sheet is long, encompassing dust pane covers, signage, lighting diffusers, window and lens covers, visors, as well as seating components, window tracks and reveals, and emergency door light fairings. That list will continue to grow. Ask about emerging technology platforms from SABIC Innovative Plastics that could allow the capability for the industry's first clear, FST compliant sheet (including OSU 55/55).

Flame retardant PC Film products FR65, FR60 and FR700 are available for use in safety labels applied on seat-backs or for interior cladding within armrests of business-class seats.

### Ultem\* sheet and film for full FST compliance

Aircraft designers are already familiar with the excellent design flexibility and outstanding mechanical properties of Ultem 1668A sheet meeting halogen-free requirements with full FST compliance. The material is compatible with thermoformed, pressure-formed, twin-sheet-formed or cold-formed applications.

Ultem 1668A sheet offers additional performance benefits including robust compliance to fire tests including toxicity when used in conjunction with leather-based decorative skins and a variety of adhesive systems used for its bonding to plastic substrate.

Ultem 1668A sheet also provides improved flow capabilities, enabling thinner walls that can translate into 10% to 25% weight savings and lower part costs compared to PVC-based sheet materials. Alternatively, it can offer the opportunity to down-gauge because of its excellent stiffness.

Candidate applications for this advanced material include first-class and business-class seats and cockpit panels.



C17 cockpit panel from Ultem 1668A sheet

### SABIC Innovative Plastics extruded sheet for flat and thermoformed applications

Lexan* Margard* FMR604 sheet Lexan Margard MRAC sheet Lexan F2000/2100 sheet Lexan 9600 sheet	FAR25.853 12 & 60 sec. vertical burn smoke density and toxicity	• Transparent and translucent sheet high-impact resistance
Lexan F6000 sheet	FAR25.853 12 & 60 sec. vertical burn smoke density and toxicity	• High-impact resistance and opaque
Ultem* 1668A sheet	FAR25.853 OSU 65/65 12 & 60 sec. vertical burn smoke density and toxicity – BSS7239, ABD0031, SMP800C	• Best-in-class flame, smoke, toxicity, high modulus and heat
Lexan XHR 6000 sheet	FAR25.853 OSU 65/65 12 & 60 sec. vertical burn smoke density and toxicity – BSS7239, ABD0031, SMP800C	• Best-in-class flame, smoke, toxicity • Integral color and high impact applications • Co-polymer that thermoforms and retains texture like polycarbonate sheet



Seat back made from Lexan F6000 sheet

The optimal balance of light weight, strength and stiffness of Azdel® Aero-Lite® composite from Hanwha L&C Corporation, Cetex® composites from TenCate B.V. and Tubus Bauer honeycombs are based on SABIC Innovative Plastics resins. These materials are designed to help usher in the next generation of lighter, more cost-efficient aircraft.

## LIGHT ON THE WING



### Lightweight Azdel® composites

Using SABIC Innovative Plastics resins, Hanwha L&C Corporation has developed Azdel Aero-Lite® products, which expand options for lightweight, dimensionally stable sheet materials. Available from SABIC Innovative Plastics, Azdel composite technology can offer up to 60% lower weight versus aluminum, 30% to 45% weight savings compared to FRP and comparable weight to honeycomb sandwich structures.

The Azdel product-line utilizes two SABIC Innovative Plastics resin technologies, Ultem® or Lexan® high-performance resins. Depending on the base resin, these lightweight thermoformable sheets can offer full FST compliance (including OSU 55/55 capability), or a combination of base properties to form a single high-performance material solution at reduced systems cost.

Azdel sheet can deliver best-in-class performance with regard to fire, smoke, toxicity and heat release. It provides intrinsic ductility compared to traditional thermoset composites, and offers 3-D part design flexibility, improved productivity and reduced secondary operations such as sanding and grinding. Azdel Aero-Lite composite also provides superior noise transmission loss at equal weight versus competitive crush-core composites for sidewall and ceiling panel applications which allows cabin noise reduction.

### Fiber-reinforced Cetex® PEI laminates

Using SABIC Innovative Plastics resins, TenCate B.V. has developed Cetex® composites, which expand options for structural, dimensionally stable sheet materials. Developed specifically for aerospace applications, Cetex continuous fiber-reinforced thermoplastic laminates offer a cost-effective alternative to the labor-intensive hand lay-up of thermoset prepregs. Developed by TenCate B.V.

in the Netherlands, these composite laminate materials rely on Ultem's engineering resin to help them offer best-in-class performance for fire, smoke, toxicity and heat release.

Cetex PEI laminates offer up to 30% weight reduction compared to conventional phenolic and epoxy laminates. In addition, they may be manufactured in the natural amber color of Ultem resin, or in a wide variety of custom colors from near white to black. That means that applications such as luggage bins, flooring and galley carts can be manufactured without secondary paint/powder coating operations. If a decorative paint is required, the Ultem-based composite requires no primer and only flash painting for visual aspect. Customers have seen as much as a 75% reduction in paint requirements using the complete system.

### Tubus Bauer honeycombs

Combined with Cetex laminates, Tubus Bauer honeycomb offers an ultra-lightweight core material based on either Ultem or Lexan resin. Ultem honeycomb is available for aerospace applications in densities ranging from 48kg/m<sup>3</sup> to 144kg/m<sup>3</sup>, offering a core material solution for applications from luggage bins and partition walls to flooring and cargo liners. Lexan honeycomb is a suitable candidate for non-OSU 65/65 regulated applications.

The unique system solution of Cetex laminate and Tubus Bauer honeycomb core can help reduce manufacturing cycle time against incumbent crushed core methods by as much as 60%. Hot melt compressing, edge folding and/or spin welded inserts all enable the system to advance new solutions for conventional manufacturing limitations.

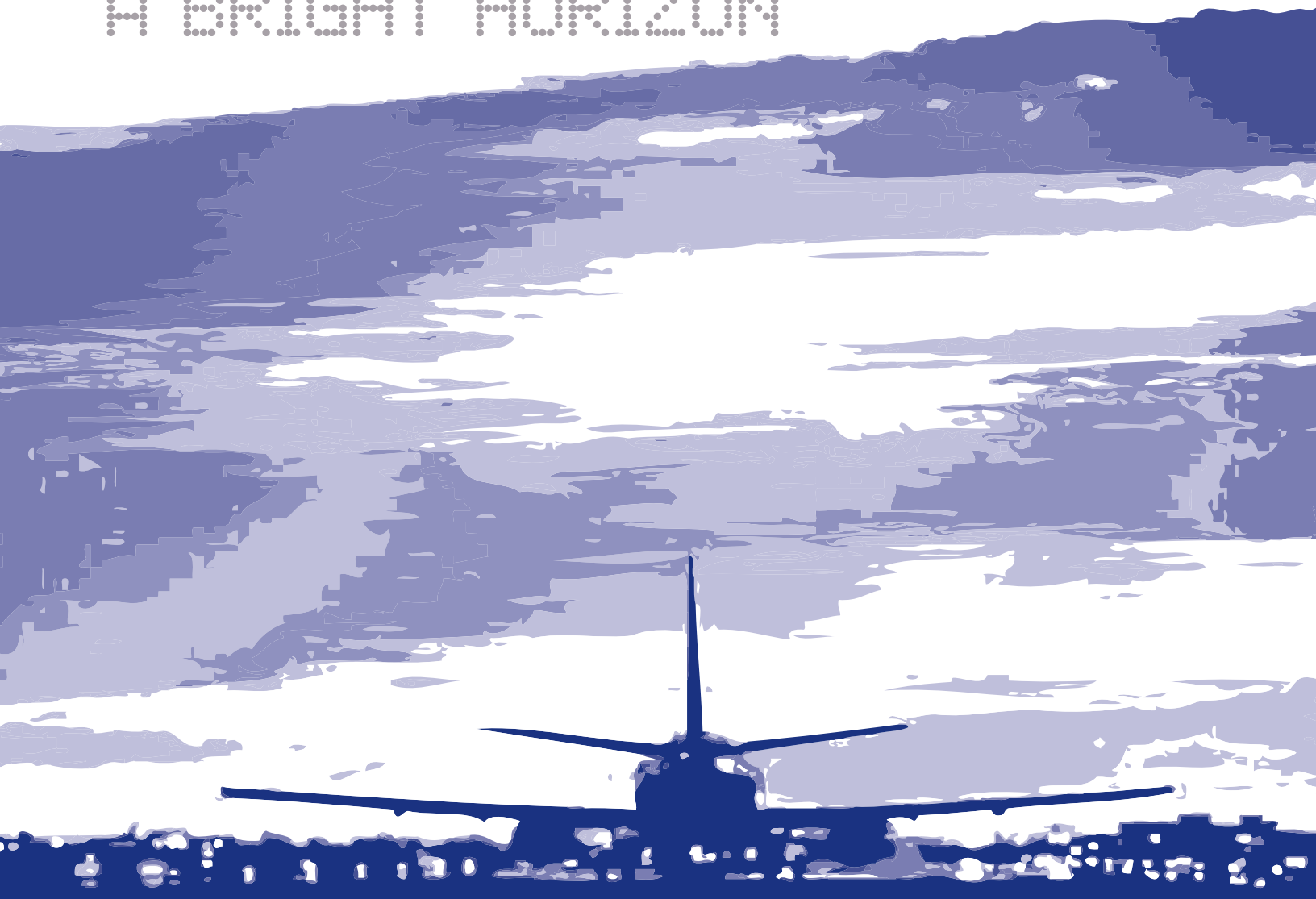
Sidewall panel made from Azdel Aero-Lite composite



Stow bin made with Cetex 3 system

As long as the aerospace industry continues to launch innovative new designs, SABIC Innovative Plastics will continue to pioneer new material platforms. Today, our cutting-edge solutions include flame-resistant fibers for fabrics and honeycomb, as well as high-temperature foams and halogen-free wire coatings.

## A BRIGHT HORIZON



### Flame-resistant fibers and fabrics

Imagine if every fiber and fabric on the aircraft interior delivered intrinsic flame resistance, as well as low smoke and toxicity. Well, SABIC Innovative Plastics already has.

Our high-performance Ultem\* resin can either be spun into fibers by melt spinning, or converted as a solvent-spun hollow fiber or membrane. Fibers made from SABIC Innovative Plastics' heat-resistant PEI resin exhibit high temperature stability because of its comparatively high glass transition temperature (215°C/419°F) versus fibers made of semicrystalline resins such as PPS or PEEK. Ultem-based fibers are available in staple, multifilament or spun yarn, and can be dyed using a dispersed dye process or solution. The dyed fibers show good color stability despite exposure to UV and washing.

SABIC Innovative Plastics' flame-resistant fiber technology is an excellent candidate for kick panel fabrics and wall-covering textiles, and offers further potential for seating, flooring and fire-block applications. The technology could also provide an alternative to crush core panels in side-wall and ceiling applications, and may enable honeycomb structures for lightweight structures demanding full FST compliance.

### Wire, cable and conduit applications

Although largely unseen, the miles and miles of wire insulation that fill today's aircraft add weight and bulk, and carry the risk of releasing potentially toxic fumes in the event of a fire. Siltem\* resins offer an alternative to conventional materials such as ETFE and PEEK.

As a siloxane-polyether-imide copolymer resin, Siltem resin offers a combination of flexibility, halogen-free chemistry, low toxicity performance and a 30 to 70% lower specific gravity than conventional insulation materials – enabling lower bundle weight and space. Siltem resins may also enable dynamic convoluted tubing for conduit, or for extremely flexible and abuse-resistant profile extrusions.

### Ultem foam

Lower weight systems are very important for aircraft interior applications. Imagine if you could have a material with the inherent flame, smoke and toxicity performance of Ultem resin but at a density that is up to 30 times lower than the resin itself.

SABIC Innovative Plastics' naturally flame resistant PEI resin can be made into a rigid foam for a structural core in multi-layer systems. Compared to conventional aramid honeycomb systems, Ultem foam offers full FST compliance, lower moisture absorption, better energy absorption properties and low dielectric loss.



First- and Business-class seats showcasing components made with Lexan\* F6000 sheet

GROUND  
SUPPORT  
FROM SABIC  
INNOVATIVE  
PLASTICS



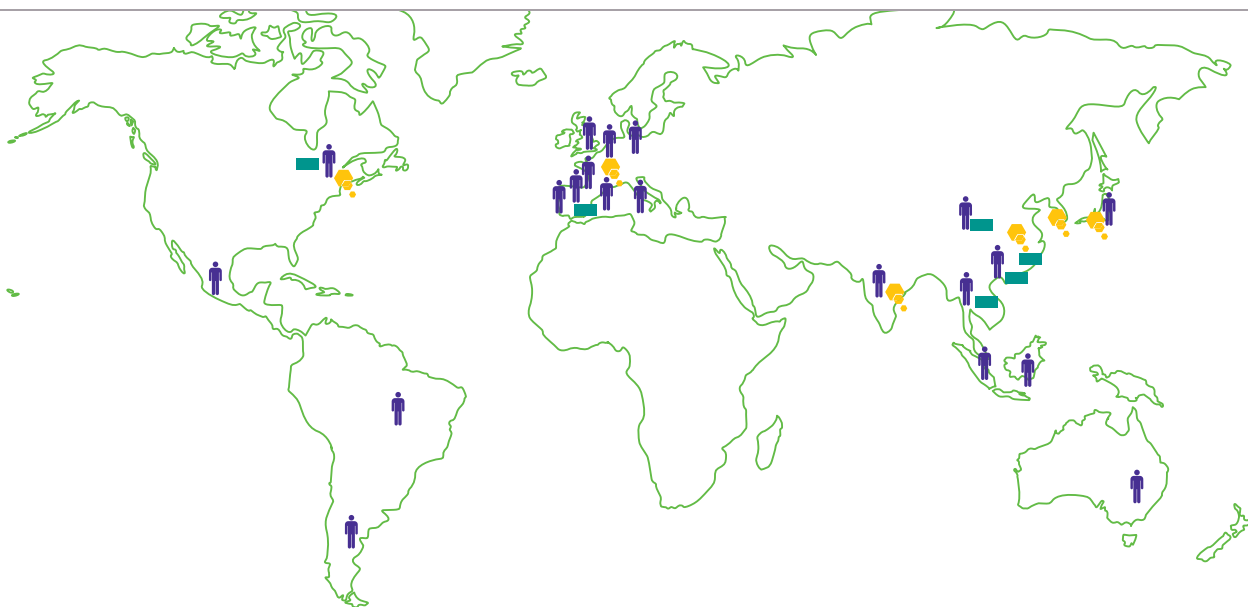
# The value SABIC Innovative Plastics offers begins with our broad portfolio of high-performance engineering resins, which provide an impressive variety of performance qualities from halogen-free flame resistance, to lightweight dimensional stability, to flexible design and outstanding aesthetics.

Performance, however, is only part of SABIC Innovative Plastics' story. We also back our materials with a Global Application Technology (GApT) organization that provides a six-phase innovation process (Six Sigma) specially designed to help customers develop, analyze and optimize materials and processes for custom applications in aircraft interiors.

With GApT Centers located in Shanghai, China; Moka, Japan; Bangalore, India; Bergen Op Zoom, The Netherlands; Seoul, Korea; and Pittsfield, Mass.; SABIC Innovative Plastics can provide advanced

materials expertise to customers around the globe. Application development specialists at each Center are available to help customers research and identify candidate materials, and find the technical resources they need to help evaluate SABIC Innovative Plastics materials in new applications.

Plus, with over 80 manufacturing, technology and joint venture facilities, SABIC Innovative Plastics is prepared to help you find a materials solutions to meet virtually any application requirement.



#### Global employees

80 locations worldwide include manufacturing technology and joint-venture sites in 21 countries.



#### Global capacity investments

Mt. Vernon, IN – Lexan Resin Copolymer Retrofit  
 Spain – Ultem Resin Plant  
 Cartageña, Spain – Lexan Resin Expansion Plant  
 China – Compounding Expansion



#### Global application technology centers

Pittsfield, MA – Polymer Processing Development Center  
 Bergen Op Zoom, The Netherlands – European Processing Center  
 Shanghai, China – China Technology Center  
 Bangalore, India – Welch Technology Center  
 Moka, Japan – Moka Technology Center  
 Seoul, Korea – Korea Technology Center

Properties of key products for aircraft interiors<sup>1</sup>

Injection molding and profile extrusion resins

Property	Units	Test method	Ultem* 9075 resin	Ultem 9085 resin	Ultem AR9200 resin	Ultem 1000 resin	Ultem 2300 resin	LNP* Thermocomp* EC 1006 compound	LNP Thermocomp LC-1006 compound	Lexan* FST9705 resin	Lexan ML4249 resin
Type			Opaque	Opaque	Opaque glass-filled	Opaque	Opaque glass-filled	Carbon fiber filled ultem	Carbon fiber filled PEEK	Opaque	Opaque & transparent
Tensile strength	psi (Mpa)	ASTM D638	13900 (96)	12100 (84)	21900 (151)	15900 (110)	24400 (168)	28420 (196)	32625 (225)	10700 (74)	9700 (67)
Tensile modulus	psi (Mpa)	ASTM D638	479000 (3300)	499000 (3440)	1010000 (6960)	519000 (3580)	1350000 (9300)	2818800 (19440)	4458750 (30750)	355000 (2450)	NA <sup>2</sup>
Tensile strain @ break	%	ASTM D638	85	72	3	60	3	1.3	1.5	90	85
Flexural strength	psi (Mpa)	ASTM D790	20900 (144)	20000 (138)	29900 (206)	23900 (165)	32900 (227)	40600 (280)	47125 (325)	16500 (114)	15200 (105)
Flexural Modulus	psi (Mpa)	ASTM D790	469000 (3240)	423000 (2920)	1049000 (7230)	509000 (3510)	1299000 (8960)	2634650 (18170)	2929000 (20200)	357000 (2460)	392000 (2700)
Izod impact, notched	ft-lb/in (J/m)	ASTM D256	1.3 (69)	2.2 (115)	1.9 (101)	1 (53)	1.6 (85)	0.8 (42)	1.4 (74)	3.2 (174)	1.7 (90)
HDT@ 264psi	Deg. C (F)		188 (372)	153 (307)	211 (412)	201 (394)	210 (410)	217 (423)	>298 (>568)	121 (249)	146 (295)
OSU 65/65, Heat release		FAR 25.853	Yes (<55/55)	Yes (<55/55)	Yes (<55/55)	No (<100/100)	No (<100/100)	NA <sup>2</sup>	NA <sup>2</sup>	Yes (<55/55)	No (>100/100)
12 Second vertical burn		FAR 25.853	Pass	Pass	Pass	Pass <sup>3</sup>	Pass <sup>3</sup>	NA <sup>2</sup>	NA <sup>2</sup>	Pass	Pass <sup>3</sup>
60 Second vertical burn		FAR 25.853	Pass	Pass	Pass	Pass <sup>3</sup>	Pass <sup>3</sup>	NA <sup>2</sup>	NA <sup>2</sup>	Pass	Pass <sup>3</sup>
Smoke density, 4 mins		FAR 25.853	Pass	Pass	Pass	Pass <sup>3</sup>	Pass <sup>3</sup>	NA <sup>2</sup>	NA <sup>2</sup>	Pass	Pass <sup>3</sup>
OEM toxicity		BSS7239 ABD0031 SMP800C	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>
Specific gravity		ASTM D792	1.3	1.34	1.4	1.27	1.51	1.39	1.41	1.34	1.28
Melt flow rate	g/10 min	ASTM D1238	2.4@295C & 6.7 kgf	8.91@295C & 6.7 kgf	5.7@337C & 6.6 kgf	9 @ 337C & 6.6 kgf	5@337C & 6.6 kgf	4.4 @ 345C	7.5 @ 400C	5.9@300C & 1.2kg	2.8 @ 300C & 1.2kg
Processing temp. range	Deg. C (F)		350-370 (660-700)	330-350 (630-660)	365-390 (690-730)	350-400 (660-750)	350-400 (660-750)	350-400 (660-750)	348 - 394 (660-740)	280-305 (540-580)	320-345 (610-650)

<sup>1</sup> This is not a complete list of products from SABIC Innovative Plastics. Product properties shown are indicative and not for specification purposes. Please contact SABIC Innovative Plastics for detailed information such as datasheets and processing guidelines.

<sup>2</sup> Data not available.

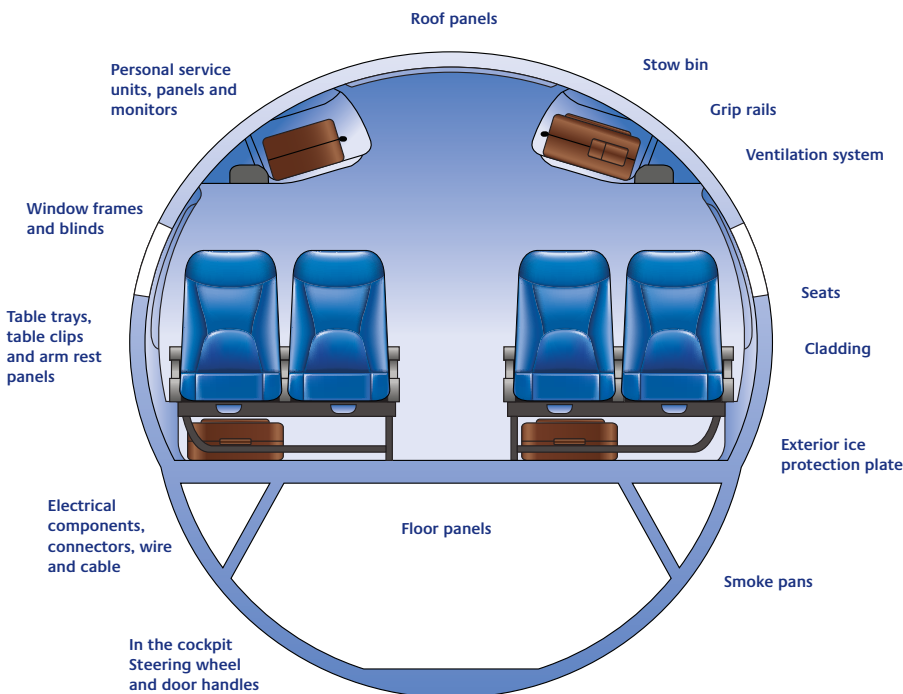
<sup>3</sup> This resin or sheet product passes this test, however manufactured lots are not certified.

ARCHITECTURE  
FOR THE SKY



## Extruded sheet and thermoforming products

Lexan ML4539 resin	Lexan 940A resin	Lexan 953A resin	Noryl* LS6010 resin	Lexan Margard* MRAC sheet	Lexan Margard FMR604 sheet	Lexan F2000 sheet	Lexan F9600 sheet	Lexan F6000 sheet	Lexan XHR6000 sheet	Ultem 1668A sheet
Opaque & transparent	transparent FR	Transparent FR	Opaque	Transparent Non-Formable	Transparent drape-formable	Transparent FR	Transparent	Opaque	Opaque	Opaque
8900 (62)	8900 (62)	8900 (62)	9200 (64)	10000 (69)	10000 (69)	9500 (60)	9500 (60)	9000 (62)	10400 (72)	13100 (90)
NA <sup>2</sup>	314730 (2170)	NA <sup>2</sup>	321000 (2220)	245000 (1689)	240000 (1655)	333000 (2300)	235000 (1620)	325000 (2240)	379000 (2615)	335000 (2310)
90	90	90	20	>80	>80	80	95	95	102	35
13100 (91)	13100 (91)	13100 (91)	14500 (100)	14000 (97)	14000 (97)	14500 (100)	13500 (93)	13200 (91)	16600 (115)	20400 (141)
324000 (2240)	324000 (2240)	324000 (2240)	346000 (2390)	350000 (2413)	345000 (2379)	334000 (2300)	370000 (2551)	325000 (2241)	362000 (2500)	460000 (3172)
12 (640)	12 (640)	12 (640)	5.6 (300)	2.4 (128)	2.4 (128)	11.2 (600)	2.4 (128)	12 (643)	3.6 (196)	1.4 (75)
137 (270)	137 (270)	137 (270)	122 (251)	132 (270)	137 (280)	138 (280)	137 (280)	132 (270)	121 (249)	189 (373)
No (>100/100)	No (>100/100)	No (>100/100)	No (<100/100)	No (>100/100)	No (>100/100)	No (>100/100)	No (>100/100)	No (>100/100)	Yes (<55/55)	Yes (<55/55)
Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass	Pass
Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass	Pass
Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass	Pass
Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>	Pass <sup>3</sup>
1.21	1.21	1.21	1.11	1.26	1.23	1.23	1.26	1.21	1.34	1.3
9 @ 300C & 1.2kg	10 @ 300C & 1.2kg	7 @ 300C & 1.2kg	5.6 (280C, 5kg)	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>	NA <sup>2</sup>
295-315 (560-600)	295-315 (560-600)	295-315 (560-600)	220-260 (430-500)	NA <sup>2</sup>	157-160 (315-320)	177-204 (350-400)	177-204 (350-400)	177-204 (350-400)	330-390 (165-200)	260-288 (500-550)



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# CIRCLE THE GLOBE



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